CAPSTONE TURBINE CORPORATION

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A Manufacturers Perspective

Capstone develops and manufactures microturbines

- Our operations are based in Woodland Hills, California.
- Our current product is the Capstone Model 330, a 30kW power plant.
- Each machine is about the size of a domestic refrigerator.
- Small technologies are not generally part of projects that require permitting.

Three (3) model 330 microturbines at Capstone s facilities in Woodland Hills, CA

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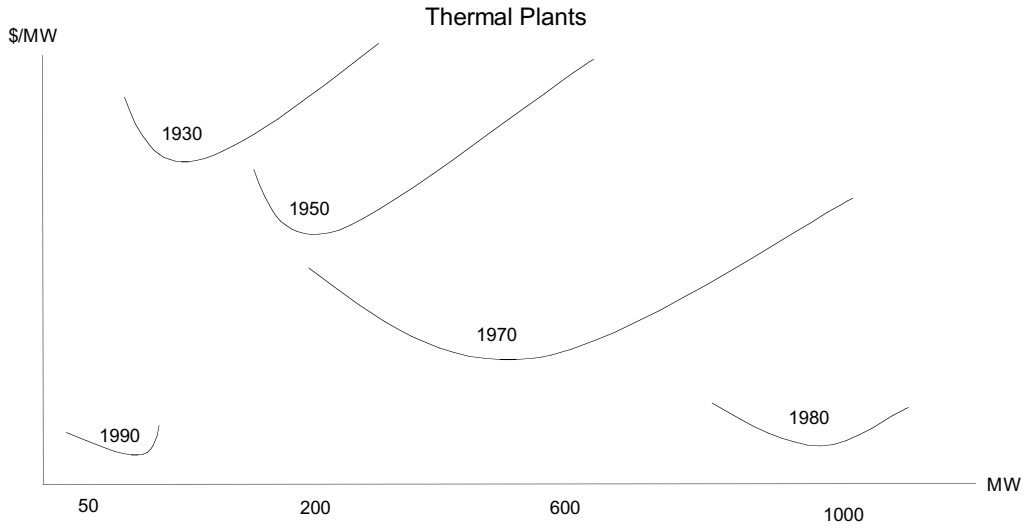
Economies of scale replace economies of size

The new Distributed Generation technologies rely on mass production to achieve competitive pricing. This represents a major departure from the trend in power generation over the last 70 year whereby price reductions (per kW) have been driven by increasing size of plant

Trends in Power Generation



Source:
TR Casten , Whither electric generation? A different view
The Energy Daily, September 7, 1995

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Achieving economies of scale reduces the scope for customization of DG products.

The Capstone microturbine has more in common with a domestic refrigerator than its size alone.

- ¥ It is UL certified
- ¥ To the extent possible, maintenance is designed out of the product
- ¥ It is internally safe, and, just like a refrigerator
- ¥ It is designed for plug-and-play operations.

Capstone mocdel 330 microturbine systemss on the production line, Woodland Hills, CA

Implications for permitting

¥The economics of small generators of the size I am familiar with cannot support full site specific planning and permitting process.

¥Equally, it is unlikely that the permitting agencies would have the resources to evaluate DG projects on a site specific basis

¥Control and regulation can best be asserted at the manufacturer level, not the site/facilities level.

¥The regulators need to specify the requirements of the technology so that the manufacturers can focus their R&D and manufacturer the appropriate product.

¥Manufacturers can design and build their technologies to meet the required standards with respect to safety and emissions.

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Automotive permitting provides some useful direction for regulating DG

From an emissions perspective, DG has more in common with automobiles than with power plants.

With automotives, the manufacturer gains certification of the engine. Individual uses are not individually certified.

The manufacturer of mobile engines knows the standards requires and can manufacture to meet the standards.

The regulator has only to regulate the few manufacturers, not the multitude of users.

A Capstone MicroTurbine, approved by the EPA, powers this Hybrid Electric Bus

An Olympus Bus powered by a Capstone MicroTurbine

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Conclusion

Natural Gas fueled (mainly gas turbine based) will likely be the most common Distributed Generation technology encountered in California in the next few years.

Smaller technologies are not generally part of projects that require environmental permitting.

If regulation is considered necessary, California State wide standards should be established that meet the State s environmental objectives and allow the manufacturers to design and manufacture technology that satisfies the requirement.

Technologies that are certified as meeting the standards should be exempt from the requirements of the CEQA.